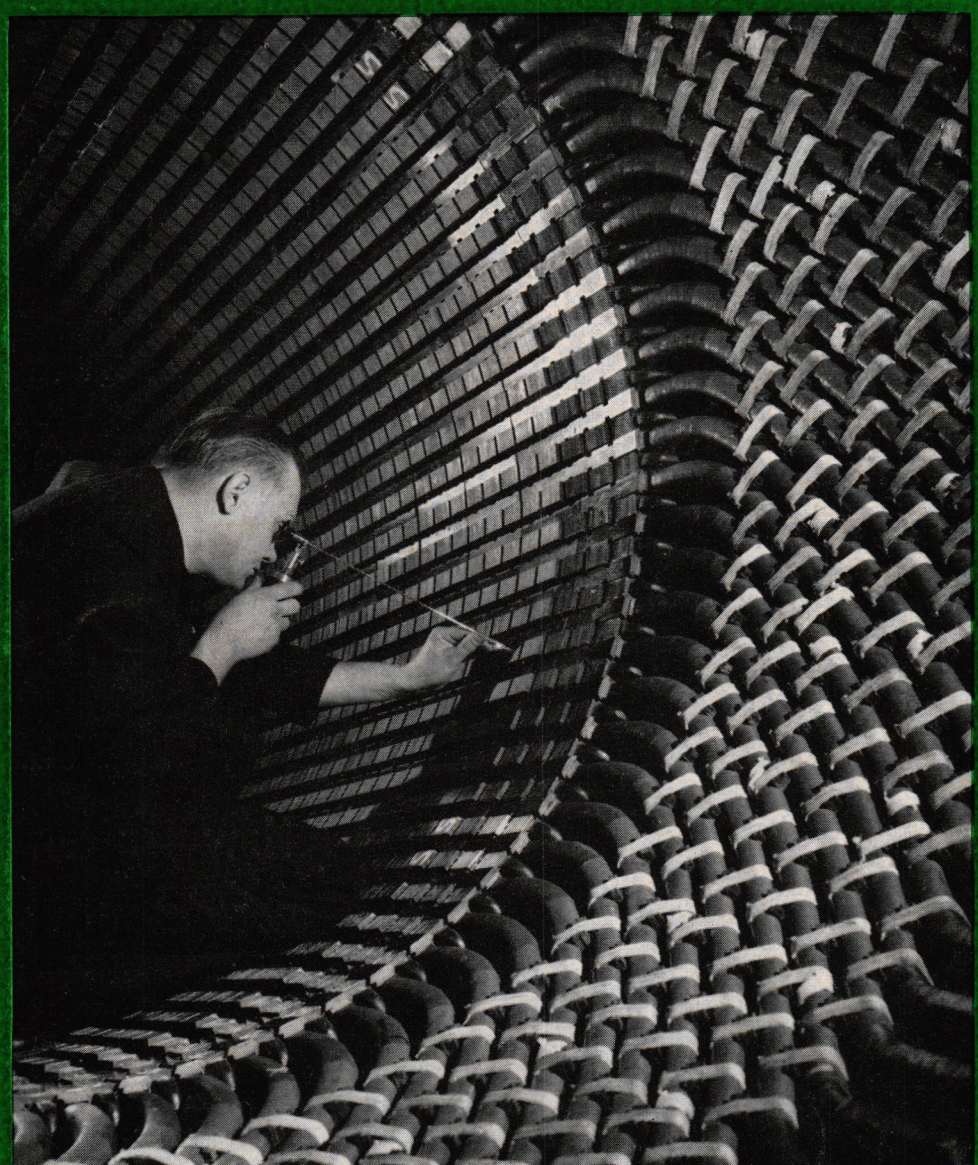
the Mechelecin

VOL. 17 NOVEMBER 1951 NO. 2



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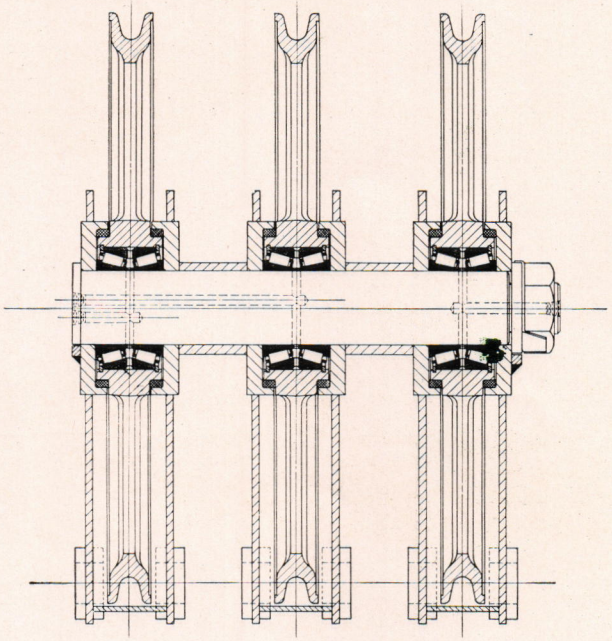

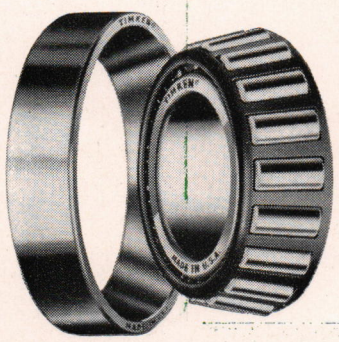

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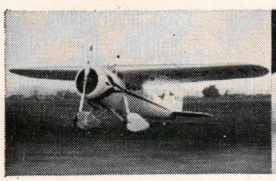

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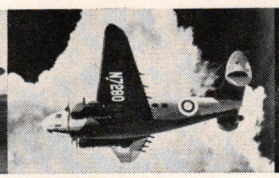

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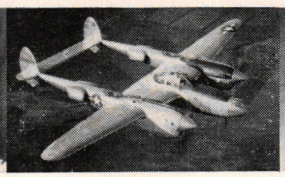

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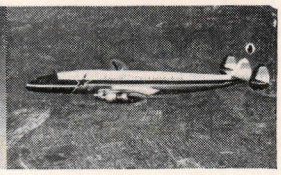

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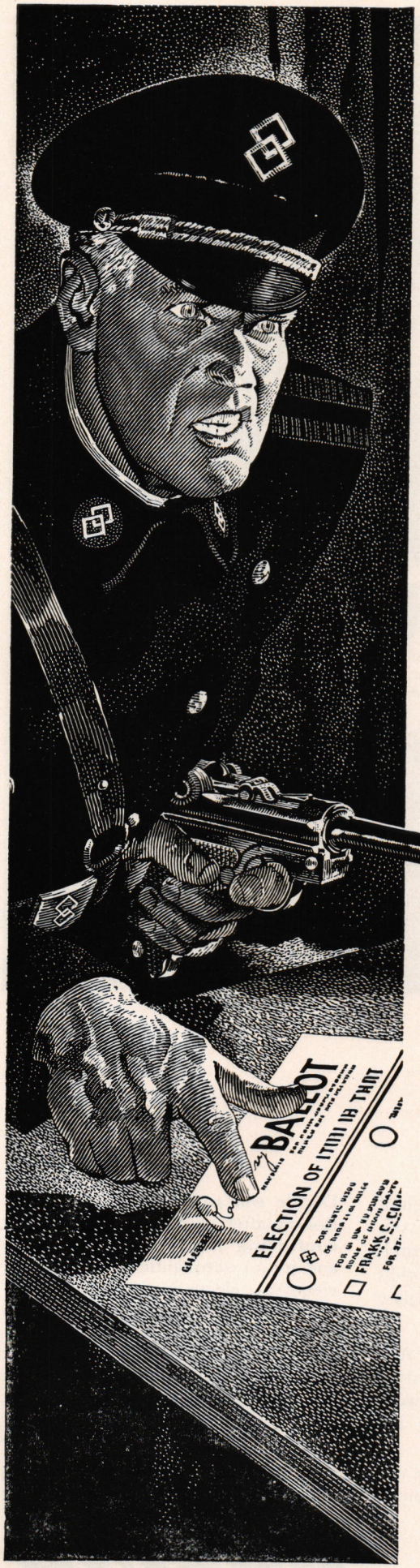

"Put your *X there!*"

"Ever have nightmares?

"I don't, often. But I sure had one last night! Wasn't my usual one, being chased by a lion and falling off a cliff. In *this* dream it was Election Day. I was at the polls, kidding with some of the boys I knew . . . but they weren't kidding back. They looked sort of worried or scared or something.

"Anyway, I got my ballot, stepped into the voting booth and pulled the curtain. I wet the end of the pencil . . . to make my X's big and black. *Then the nightmare part began.*

"A tough-looking soldier stepped into the booth. He put his finger on the ballot and said, *'Put your X THERE! And THERE . . . and THERE . . .'* None of the names I'd picked, either. He had a big black gun pointing right at me.

"That was last night. Today, all day, I've been thinking about it. I'd known that was how some elections got settled in other places. But it never occurred to me before how lucky I was to be a citizen of *this* country. *Here* I vote according to my conscience, not a gun. And I do other things the way I please . . . like going to church, or picking out my own kind of job down at the Republic plant. Try that where there's no freedom!

"That's it . . . *Freedom!* We've got all the Freedom in the world. But, honestly now, do we *really* appreciate it? Do *you?* I admit I've done *my* share of griping . . . probably never will get over that habit.

"But, with Freedom-grabbers at work here as well as abroad, I want to be sure on Election Day that we're *all alone* in that voting booth. With nobody to tell us, *'Put your X THERE!'* No sir!"

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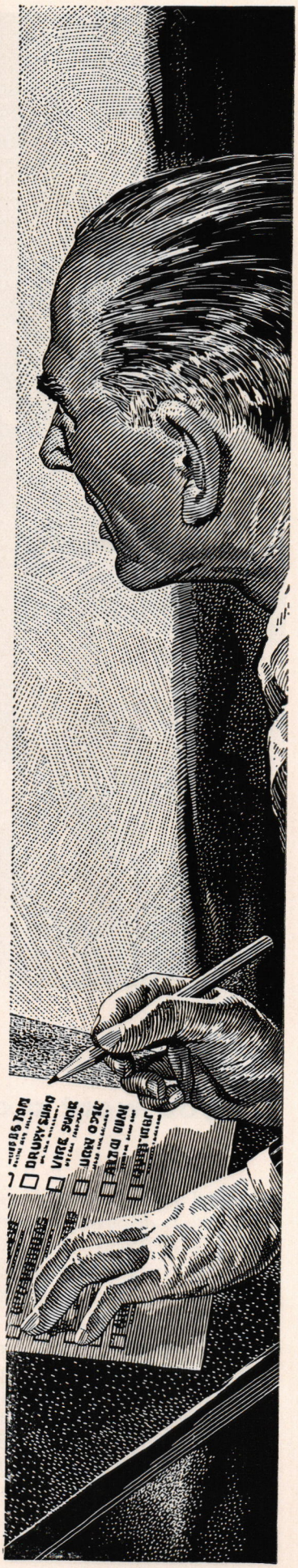

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IN THIS ISSUE

Editorial ..... page 9
Radiant Heating 10
What Happened to Last Year's Graduates? 12
The Turbo-Encabulator 13
Alumnews 14
Engineering Personalities 15
News and Views 16
Societies and Fraternities 17

Frontispiece, *A "corona motor" at the Trafford, Pa., laboratories of Westinghouse. When 1,000,000 volts are applied, the jet action of the corona discharge from the trailing tips of the bent rods causes the assembly to rotate.*
—Photo courtesy of Westinghouse

ENGINEERING SCHOOL CALENDAR

November

November 4—Mecheleciv staff meets at 2:30 p.m. in the office. Cherry Tree picture will be taken.

November 7—Engineering societies meet at 8:15 p.m. in the Hall of Government. Rooms will be announced later.

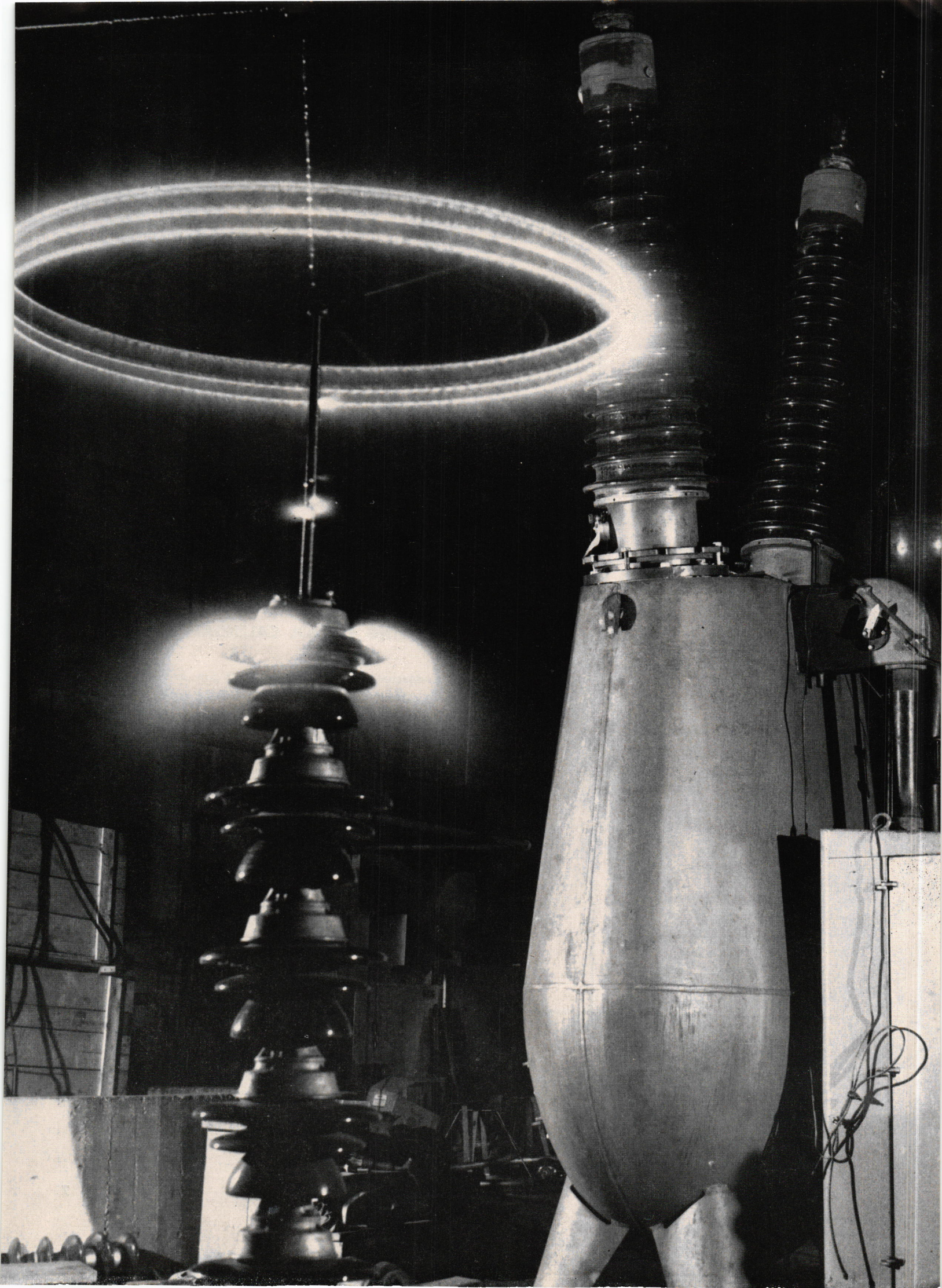
November 10—Theta Tau invites all members of the Engineering societies to a shrimp feast, ball game, and beer party at Meadowbrook (North end of Rock Creek Park in Maryland) at 2:00 p.m.

November 14—Theta Tau meets in room 202, Building D, at 8:15 p.m. Cherry Tree picture.

November 21—Sigma Tau meets in room 200, Building C, at 8:15 p.m.

November 28—Engineers' Council meets in the conference room, Student Union Annex, at 8:15 p.m. All interested engineers are invited.

. . . **ON OUR COVER.** *A "Dynamo Doctor" in action. An engineer using a medical cystoscope to examine the insulation deep within the coils of a generator stator.*
—Photo courtesy of Westinghouse.



EDITORIAL

THE SHORT SPEECH made by Dean Mason at the Mixer last month has become the center of a discussion in which there are many different but equally strong views as to what the new Dean's objectives are.

Because of the vigorous discussion, and also because our own interpretation of his speach was disquieting, we asked Dean Mason to clarify his ideas for us. We concluded the interview completely in sympathy with what he is trying to do. We will admit that part of our conversion was due to the Dean's persuasiveness. He stated his position in very quotable phrases, and with obvious sincerity. We also agree with the Dean's objectives because we find them to be our own.

Put briefly, Dean Mason said "I hope to shape the School of Engineering to produce the highest quality professional men, by which I mean men who are first good citizens, and second, the best engineers." He does not propose to turn out slide-rule pushing technicians, as some have contended. Far from it. He emphasized that his idea of a professional engineer was "not a narrow technical man, but a well-rounded individual, at least familiar with the humanities, who has been equipped not only to do a sound job, but also to assess its importance."

The Dean spoke again and again of a "professional atmosphere" and an "atmosphere of learning" which he hopes will grow in the School of Engineering. He pointed out that while at school the student pays for the opportunity to "pick the brains" of his professors, who should be men of unquestioned stature in their fields, but the student makes the determination of whether or not he gets his money's worth. One who plows through school with no aim other than the sheepskin is making a poor investment. Even worse, he is dulling the teacher's desire to teach, since the incentive for teaching is provided by the student.

The "professional atmosphere" must come from insistence that students be good citizens of the University, thus developing a vital sense of public responsibility. The "atmosphere of learning" must come largely from within the individual student, but can be helped along by the example and endeavor of a respected Faculty, by weeding out those who are in but not of the University, and by critically analyzing the curriculum to make it a challenge to the mind. The Faculty is beginning a careful and intimate survey of the philosophy of engineering education, and a curriculum revision is forthcoming, eliminating descriptive courses and emphasizing rational analysis of engineering problems.

We are heartily in accord with these aims.

Radiant Heating

by Charles H. Plyer, Jr.

Undergraduate in Mechanical Engineering

In the last few years, interest in what is called "radiant heating" has risen rapidly. Many installations of this type of heating system have been made. For this reason, all engineers ought to know something of the pros and cons of radiant heating.

On the one hand, its proponents claim the following for radiant heating:

(a) It is esthetically pleasing.
(b) Floors are warm.
(c) It is modern.
(d) It is cheaper to install than conventional systems.
(e) It is cheaper to operate than conventional systems.
(f) It is healthful.

This last claim is really a combination of two claims, i.e., that radiant heating produces more natural conditions in the home, and is thus more healthful, and that radiant heat bathes the occupants of the home in healthful radiation, much as does the sun.

The opponents of radiant heating counter the above by contending:

(a) Radiant heating costs more to operate.
(b) "Pick-up" is slower than with conventional systems, i.e., from a cold start, a building heats up more slowly than it would with other systems.
(c) That it is not more healthful.

Before discussing the above arguments, let us first define what we mean when we say radiant heating.

Radiant Heating. Radiant heating may be defined as any method of creating the sensation of heat by means of radiant energy waves from a source which is at a higher temperature than the receiving body.

Radiant panel heating. As used in this discussion, "radiant panel heating" is a radiant heating system which uses relatively large flat plates operating at low surface temperatures (under 150°F) as the primary energy source.

ATTAINING THERMAL COMFORT

It is generally known that the human body requires no heat from without (unless exposure has already appreciably reduced the body temperature), because the body generates more heat than we require. Many experiments have led to the conclusion that the average sedentary adult developes about 500 btu per hour. This is disposed of as follows:

100 btu—used up in body operation and repairs
190 btu—radiated to surrounding surfaces
110 btu—convected to ambient air
100 btu—evaporated, exhaled and excreted
500 btu

Anything which disturbs this normal output of heat results in thermal discomfort. Heated surroundings and ambient air, such as one finds in the summer months, reduces the amounts of heat which the body can reject by radiation and convection, causing a sensation of heat. The body responds by urging the person to remove clothing, reduce his activity, to perspire, and otherwise to increase his heat emission. In cold surroundings, the body urges the person to don clothing, reduces the flow of blood near the surface of the skin, and even induces involuntary work, shivering, to increase the heat production and thus balance the abnormally high heat emission. In each of these situations, the body has been able to balance the heat emission, but still there is a sense of thermal discomfort. True thermal comfort exists only when each of the bodily methods of rejecting heat operates at or near its normal level.

Historically, there have been three approaches to this problem. The first was to clothe the body. This had one great advantage: it required no energy input. Unfortunately, it is not possible completely to enclose the body in clothing, and in cold weather the bulk of required clothing reduced freedom of movement. The second approach was to use an alternate energy source, or to build a fire. In this method, no attempt is made to reduce excessive heat emission, but lost heat is balanced by heat radiated to the individual by the fire. This requires very little energy input, but one must remain near the fire, and the energy received is highly directional. The third approach is to provide a nearly normal thermal atmosphere, i.e., to heat the house. This is a very wasteful practice from the thermal viewpoint, requiring an input of hundreds of thousands of btu's of energy to prevent the loss of a few hundreds of btu's by two or three individuals. However, it provides the maximum freedom of movement for these individuals, and until something better is devised, mankind seems willing to pay the high cost.

Conventional heating systems have provided the nearly normal thermal atmosphere by heating the ambient air by convection, and allowing this heated air to warm the interior surfaces of the home. A substantial degree of comfort has been obtained by these methods. However, they are not typical of the outdoor situation. Outdoors, the ambient air is slightly cooler than the surrounding surfaces, which are warmed by the radiant energy of the sun, while the convection heating systems result in ambient air temperatures slightly above that of the surrounding surfaces.

Radiant panel heating attempts to provide an atmosphere in which each of the body's methods of rejecting heat can be carried on at its normal rate. It attempts to do this by supplying a large part of the available energy as radiant energy, raising the temperatures of the surrounding surfaces by radiating to them, and allowing the air to be warmed by convection from these surfaces. The aim of radiant panel heating is not the adding of heat to any individual by radiation, but to control the rate of loss of heat by the individual.

PRINCIPLES OF RADIANT PANEL HEATING

Whenever two adjacent surfaces are at different temperatures, that which is at the higher temperature will radiate energy to the other, in the general ratio as follows:

$$q_r = k\ A\ (T^4_x - T^4_y)$$

in which q_r—heat interchanged; k—a constant; A—area; and T_x and T_y are the absolute temperatures of the hot and cold surfaces, respectively. Included in k are the Stefan-Boltzmann proportionality constant ($z = 1730 \times 10^{-12}$), an angle factor which compensates for the angles between the surfaces, and an emissivity factor which compensates for the difference between the surfaces involved and a perfect radiator. Many experiments have established that the emissivity factors for most building materials are between 0.90 and 1.00, and that a reasonable average for the floor, ceiling, and the walls of the average structure is 0.94.

Inspection of the formula shows that there are two means available for increasing the amount of heat inter-radiated: the difference in the absolute temperatures can be increased, or the radiating area can be increased.

If we use a small area, and greatly increase the temperature difference, we radiate much energy, but this energy is highly directional, just as it was in the case of the camp-fire.

If we use a large radiating area, our cold body must have a large area also. We are concerned with the difference between the average surface area of the cold surfaces (called the Mean Radiant Temperature or MRT) and the surface temperature of the radiant panel. Practically, we are also concerned with where we can locate this large surface in the building. The surfaces of the walls, the ceiling, and the floor have all been utilized as radiant panels. In each case the other surfaces are considered as the cold body which is to be irradiated, and T_x becomes the panel surface temperature in our equation.

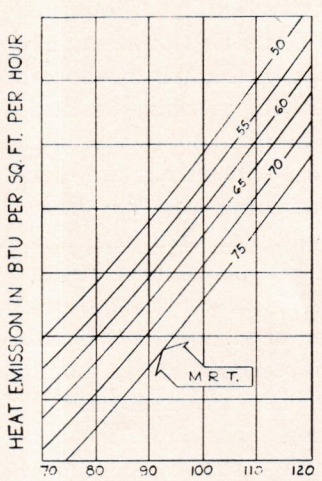
There are some practical limits upon how high panel surface temperatures can be. Some commonly accepted maximum values are quoted from the American Society of Heating & Ventilating Engineers Guide as follows:

Plastered ceiling	115°F maximum
Plastered walls	120°F maximum
Floors, any construction	85°F maximum

If the walls or ceiling are of metal or concrete, the above values may be exceeded somewhat, but in no case should surface temperatures be over 150°F. Some medical authorities contend that floor temperatures over 75°F result in a reduction of vascular tone, leading to drowsiness and possibly to varicose veins in the legs, but the concensus is that any temperature up to 85° F is safe for floor temperatures. The limits on ceiling and wall temperatures are imposed by the tendency of the plaster or concrete to crack and crumble at higher temperatures.

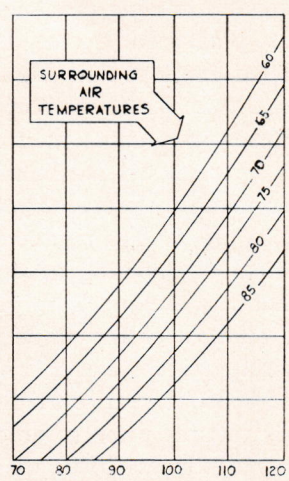
It is obvious that limiting the allowable surface temperature of the radiant panel limits the btu output per unit area. This means that in designing a panel heating system one may find that available panel area is too small. This is often the case when floor panels are used. The reason for this is the low btu output of a panel at low surface temperatures, as can be seen from Figure 1. At 85° F surface temperature and a mean radiant temperature of 70° F (average

(continued on page 20)



Heat Emission by radiation from panels when surrounded by surfaces of various temperatures giving an average MRT according to curves.

Figure 1



Heat Emission by convection from radiant heating panels with still air at various temperatures according to curves.

Figure 2

What Happened to Last Year's Graduates?

by Emmett DeAvies

Undergraduate in Electrical Engineering

Department	Number of Graduates	Per Cent Employed	Per Cent in Engineering	Average Annual Salary
B.S. in Engineering	12	100 %	75 %	$3360
Civil Engineering	20	100 %	86 %	$3720
Electrical Engineering	39	100 %	92 %	$4200
Mechanical Engineering	34	100 %	94 %	$4030
Total	105	100 %	87 %	$3828

In spite of the many pessimistic long-range forecasts given by the Bureau of Labor Statistics and authorities, the record of employment of engineering graduates and specifically, the graduate engineers at the University, has been exceptionally good. After World War II and up until June of last year authorities were gloomy over the increasing number of students entering the engineering curricula along with a working field that was not increasing as rapidly. However, a serious shortage of engineers has developed since mid-1950, owing primarily to the increased demand for personnel generated by the defense program. During one academic generation (from 1947 through 1950) the engineering colleges of the U. S. turned out increasing numbers of graduates annually, with a 1950 graduation of over 50,000 engineers. The 1951 class, however, was less; only some 37,000 students entered the business world.

From statistics gathered in a survey by the Mecheleciv concerning this University's engineering graduates of last year, there is good indication that graduates are finding employment plentiful. All graduates are employed. A very large percentage of them have been employed in engineering fields; those who are not, with a few exceptions, are working in fields closely related to their specialties.

Average starting salaries of our engineers are higher than any previous year, indicating that the graduates are probably more satisfied with their jobs. Electrical engineering graduates are being paid highest salaries, ranging from $15 to $74 a month more than graduates of the three other departments. Highest paid engineer is an EE who is receiving $530 a month, or $6360 a year, even though he was employed only six months prior to graduation. The Bureau of Labor Statistics shows that average starting salaries of engineers is from $10 to $15 a month lower than those of the GWU graduates.

Many of the graduates had obtained jobs before graduation. Some held out until afterwards; but 97 per cent were hired by the end of August, and the remainder were employed by the following month. Most felt that they had obtained permanent jobs. A few who didn't were an enlistee in the Air Force who is doing a four-year hitch with no time off for good behavior, and another who was recalled from the reserve to active duty in the Army.

A surprisingly small number are employed by the Federal Government, but over half of the graduation class is working in the Washington area. Equally surprising is the fact that those employed in the local area are averaging about $5 a month more than the overall average salary.

After only 6 months, many of our graduates have migrated to widely spread points in the country. One EE and one ME have gone to the west coast, one ME is in Texas, and another EE is in Ohio, but the most popular state away from D. C. seems to be Pennsylvania, where around 37 per cent have rooted.

A few students were interested in going on to graduate work. Some are taking graduate work in Physics, some in Law, and one in Chemistry. There were many unsolicited good comments about the University.

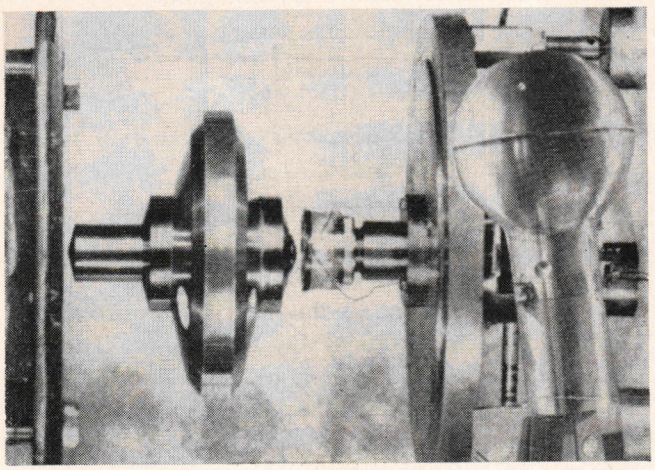
The types of work our graduates are doing are as varied as their locations. One electronics engineer is working for the Federal Government at the Fish and Wildlife Service in College Park, Maryland. He is designing an electronic device to search out and catch fish. Another EE is in charge of the weight control of the Westinghouse J-40 series Turbo-Jet engine to be used in a new plane called the F3H McDonnell "Demon".

Most encouraging was the enthusiasm shown by the graduates and their great interest in this magazine. All but a few responded well to our inquiries for information for this story.

(Editor's note. This is the first of two stories about engineering employment written from actual statistics. Next month, watch for "What Will Happen to This Year's Graduate", based on Bureau of Labor Statistics forecasts.)

The Turbo-Encabulator

(Editor's note: This article was reprinted from the Industrial Bulletin of Arthur D. Littel, Inc. For nearly 10 years, the MECHELECIV has endeavored to interpret and print scientific information in terms that the undergraduate can understand. The contribution below, however, is of such basic significance to the process of scientific thought, as well as to the world's industrial progress, that, in spite of its precise terminology, we have decided to present the article for the benefit of those engineers who can fully appreciate it. The author of this paper, for only too obvious reasons, preferred to remain anonymous.)



The floating encabulator element

For a number of years now, work has been proceeding in order to bring perfection to the crudely conceived idea of a machine that would not only supply inverse reactive current for use in unilateral phase detractors, but would also be capable of automatically synchronizing cardinal grammeters. Such a machine is the "Turbo-Encabulator." Basically, the only new principle involved is that instead of power being generated by the relative motion of conductors and fluxes, it is produced by the modial interaction of magneto-reluctance and capacitive directance.

The original machine had a base-plate of prefabulated amulite, surmounted by a malleable logarithmic casing in such a way that the two spurving bearings were in a direct line with the pentametric fan. The latter consisted simply of six hydrocoptic marzelvanes, so fitted to the ambifacient lunar wane-shaft that side fumbling was effectively prevented. The main winding was of the normal lotus-o-delta type placed in panendermic semi-boloid slots in the stator, every seventh conductor being connected by a non-reversible tremie pipe to the differential girdle-spring on the "up" end of the grammeters.

Forty-one manestically spaced grouting brushes were arranged to feed into the rotor slip-stream a mixture of high X-value phenylhydrobenzamine and 5 per cent reminative tetryliodohexamine. Both of these liquids have specific pericosities given by

$$P = 2.5C \frac{P - 7}{n}$$

where n is the diathetical evolute of retrograde temperature phase disposition, and C is Cholmondeley's annular grillage coefficient. Initially, n was measured with the aid of a metapolar refractive pilfrometer (for a description of this ingenious instrument, see L. E. Rumpelverstein in "Zeitschrift für Elektrotechnistatischs-Donnerblitze," vol. vii), but up to the present date nothing has been found to equal the transcendental hopper dadoscope. (See "Proceedings of the Peruvian Academy of Skatological Sciences," June, 1914.)

Electrical engineers will appreciate the difficulty of nubing together a regurgitative purwell and a supramitive wennel-sprocket. Indeed, this proved to be a stumbling block to further development until, in 1942, it was found that the use of anhydrous nangling pins enabled a krytonastic bolling shim to be coupled to the tankoid.

Early attempts to construct a sufficiently robust spiral decommutator failed largely because of a lack of appreciation of the large quasi-piestic stresses in the garvin studs; the latter were specially designed to hold the roffit bars to the spar-shaft. When, however, it was discovered that wending could be prevented by a simple addition to the reeving sockets, almost perfect running was secured.

The operating point is maintained as near as possible to the n.f. rem peak by constantly fromaging the bitumogenous spandrels. This is a distinct advance on the standard nivel-sheave in that no dramcock oil is required after the phase detractors have remissed.

Undoubtedly, the turbo-encabulator has now reached a very high level of technical development. It has been successfully used for operating nofer trunnions. In addition, whenever a barescent skor motion is required, it may be employed in conjunction with a drawn reciprocating dingle arm to reduce sinusoidal depleneration.

ALUMNEWS

In spite of the fact that notices were late getting around, there was a very good turn-out of alumni for the Theta Tau Founders' Day banquet and dance held at the Lee House on October 7. We saw *George Pida, John Paul Connor, Al Craft, Merrill Brown, Howie Grayson, John Lewis, Fred Holcomb* (the ORIGINAL Mecheleciv editor), and *Tom Shipp,* to mention only a few. A shrimp feast is slated for November 10, and we hope that all you alumni will be able to come. This is your invitation. Details can be found in the "Engineering School Calendar", on page seven.

As you were notified in our May, 1951 issue, the Mecheleciv is now being mailed on a different basis. Subscriptions are now for one calendar year for alumni. Dick Caldwell, our business manager, asks that those of you who have not yet renewed your subscriptions for 1952 please send the dollar in early, because the clerical work involved in the last minute rush may delay your getting the first issue next year if you wait until late December to send in your subscription.

We sent our spy around to the Navy Department this time, to see who he could find there. In the Bureau of Ordnance he struck a regular gold mine of alumni. Six of the boys are Ordnance Engineers. They are: *H. J. Portch,* BME 35, *Chester F. Bilinski,* BME 51, who is in the Rocket Section, and gives as his new address 1416 Quinwood St., Langley Park, Hyattsville; *Earl H. Jensen,* BME 49, in the Missile Launcher Section, who tells us he has just purchased a cattle farm in Fairfax County, and can now be reached at Route 1, Clifton, Va.; *Bill Gaines,* BME 48, who works with Earl in the Missile Launcher Section; *Joseph Widman,* BME 50, in the Gun Design Section; and *Edwin O. Stengard,* BME 48, who is in the Gun Design Section also, after having worked for Babcock & Wilcox in Cleveland, the Link-Belt Co. in Minneapolis, and Westinghouse in Lima, Ohio.

Also in the Bureau of Ordnance are *Harry A. Alburger,* BME 27, who is head of the Assemblies Unit in the Gun, Mount, and Missile Launcher Section; *Paul W. Burk,* BME 26, Engineer in Charge of Gun and Mount research and development; *A. J. Stanton,* Engineer in Charge of Gun, Catapult, and Turret research and development; and *Frank B. Weathersbee,* BME 47, who is now in charge of the Gun Design Section, after having served for some time at the Naval Gun Factory here in Washington.

In the Bureau of Yards and Docks is *Herbert W. Haller,* BME 35, who is head of the Mechanical Design Section and has been with Budocks since 1927. He is living in Herndon, Virginia.

Four of our alumni are located in the Bureau of Ships. They are: *Jimmy Sinsabaugh,* BME 49, who has been working on maintenance and production of auxiliary steam turbines and gears in the Turbines and Gears Branch since his graduation; *John O. Wagner,* BME 50, in the same branch, but doing research on gear design for main propulsion machinery; *Wally Kistler,* BME 49, who after having served as a junior engineer on rotating assignments (we've always wondered what a rotating assignment was,) is now permanently assigned to conversion work on piping and machinery arrangements; and *R. T. Surine,* BME 49, who is writing specifications in the development of piping and piping components.

Bert M. Randall, BME 40, after a tour of duty as a patent examiner, and another tour of duty in the Navy for five long years during World War II, has been with the Bureau of Ships since 1946 as Project Engineer for the guided missile program.

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ENGINEERING PERSONALITIES

UNDERGRADUATE

Those of you who attended the Engineers' Mixer during the first week of school will doubtless remember the genial master of ceremonies, Herb Rosen. How he happens to be connected with the Engineering School is a very interesting story.

Herb lived in Philadelphia, Pa., from his birth in 1924 until World War II began. After graduating from high school, he went to work for the Army Signal Corps as an inspector of radio equipment at the Philco Corporation in Philadelphia.

Rosen entered the Marines in 1942 as a radar technician and started overseas with a seacoast artillery battalion. Before he got past Hawaii, he was rerouted to Quantico to study a new electronic gun director. There he met the present Mrs. Rosen, during one of his liberties in Washington. From Quantico, Herb went to the Aberdeen Proving Grounds, where in 1945, he achieved the distinction of being the only Marine to be married on this Army base.

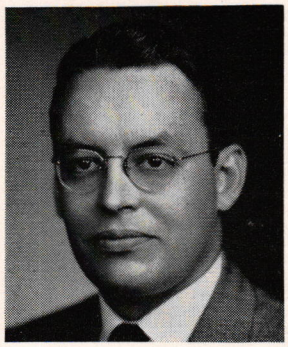
In April of 1945, Herb was sent back overseas, this time as a gun director technician in the Marianas. In October, 1945, he exchanged the Marine Corps forest green for civilian garb. The Rosens returned to Phildelphia, where Herb resumed his duties with the Signal Corps.

By this time Rosen began to realize that a college education was an almost indispensable asset to a career in electronics. He enrolled at the University of Pennsylvania in 1946, attending classes there for a full year before the offer of a tempting job in New York State caused him temporarily to discontinue his education.

Herb came to GWU while installing a new FM transmitter for WINX, in time to enroll in the winter-spring semester of 1948. During this semester he went to the National Bureau of Standards as a Laboratory Technician. He is still working at the Bureau, but he is now editing the technical news bulletins dealing with radio propagation, physics, mathematics, electricity, and guided missiles.

In the fall of 1950, Herb was elected to Sigma Tau, honorary engineering fraternity. Last spring he was chosen for a year's term as treasurer of Sigma Tau. In addition, the IRE, of which Herb has been a member since coming to the University, elected him to represent the chapter on the Engineers' Council.

ALUMNUS



As a member of the administrative staff of The George Washington University, Business Manager Donald D. Blanchard is well known to students and faculty alike. Some may not know, however, that he once was a student at the University, and graduated not too many years ago from our School of Engineering. What is more, during the three and a half years he attended this school as an undergraduate, he achieved prominence both in engineering activities and in scholarship.

Born in St. Paul, Minnesota in 1918, Don arrived in this world just in time to celebrate the signing of the Armistice.

He began his engineering education by attending classes leading to a BCE degree at the University of Minnesota. This lasted only a year, however, as the Second World War interrupted his college career.

While in the Army, Don earned the rating of Warrant Officer, and served with an antiaircraft artillery unit. In 1945, with the end of hostilities, Don left the Army. He was married that fall, and shortly thereafter moved to Washington, where he began attending George Washington University, working part time with the Washington Gas Light Company as a field engineer.

Blanchard's undergraduate record is an interesting one because it is characteristic of most of our successful alumni. He was initiated into Theta Tau in March of 1946. He subsequently held two offices in that organization, those of secretary and Regent. In the late fall of 1948, Don was chosen by the chapter to represent it at the National Convention. He returned with the coveted title, "outstanding delegate," bestowed by the convention.

Don was also a member of Sigma Tau, of the American Society of Civil Engineers, of Sigma Pi Sigma, physics honorary, and Member-at-large to the Engineers' Council. He received his degree in February, 1949, and two months later became the Business Manager of the University.

Don is an active member of the American Society of Civil Engineers, Washington Professional Chapter, the National Capital Alumni Association of Theta Tau, and the Engineers' Club of Washington. He is also a member of Beta Theta Pi social fraternity, which he joined while attending the University of Minnesota.

NEWS AND VIEWS

ENROLLMENT DOWN 10%

True to all predictions, enrollment in the School of Engineering has decreased this semester. The trend toward night school is becoming more evident since the majority of the veterans who were going full time have graduated, while the part time student veterans are still here. Compared with an enrollment of 654 students last fall and 608 for the past winter semester, 577 engineering students are in attendance at this time, a drop of about 10 per cent a semester. Veteran enrollment is still quite high, however; 359 engineers are registered under the G.I. Bill.

The percentage of veterans registering as new students is at an all-time low. Those who were interested in taking advantage of the Bill have already done so and those who were eligible but did not continuously register in their chosen course or curriculum are no longer eligible since the Bill was terminated for all general purposes this last summer. Only students who have repeated registration in the same curriculum or who were called into service while attending school under the Bill will be permitted to continue under its benefits.

The Electrical Engineering Department has the largest enrollment in the School of Engineering; 244 students are working on an EE major. Mechanical Engineering comes next with 126, then BS in Engineering students, 108, followed by 99 CE's. Professor Walther, Head of the Civil Engineering Departmetn, feels that this department is long overdue for an influx of civil engineering aspirants.

MIXER

Dean Martin A. Mason was introduced to the students of the School of Engineering by the retiring Dean, Frederick M. Feiker, at the annual Fall Engineers' Mixer, held October 3rd in the Knights of Pythias Hall, at 1012 Ninth Street. In a short talk, Dean Mason greeted the old and new students and outlined briefly and informally some of his plans for developing and improving the Engineering School.

Refreshments were served to the two hundred or more students and alumni who attended the mixer, and faculty members present were introduced to the students, as were the presidents of the engineering societies on campus, and the two engineering fraternities. The mixer is held once each semester, to encourage students to meet their fellow students and faculty members informally and become better acquainted with the facilities available at the School.

FACULTY CHANGES

Many faces that were familiar to most engineering students are absent this year, and a few faces have been added. The past summer saw the appointment of Dr. Mason as the new Dean of the School of Engineering, the departure of the Head of the Electrical Engineering Department on sabbatical, the resignation of the Assistant Dean, and the resignation of a professor in the EE Department.

Professor N. B. Ames, Head of the Electrical Engineering Department, left this summer with his family for Zurich, Switzerland, where he intends to study toward his PhD at the Federal Institute of Technology. He will resume his duties at the University next year. No one has been appointed to substitute for him; his administrative duties are being handled by the Dean, while Professors Antel and Carley are handling the instructional portion of the Department.

Professor Walther, who served in the office of Assistant Dean for four years, has resigned from that office. Dean Mason has not announced plans to fill that position. Professor Dickinson has resigned as professor of electrical engineering.

CIVIL SERVICE OPENINGS

The US Civil Service Commission has announced a new examination for filling positions in all branches of engineering, including Aeronautical, Civil, Electrical, Electronics, Mechanical, and Architecture. Salaries range from $3100 to $10000 a year; positions are being filled for the Washington area only.

Applications will be accepted from graduates and undergraduate students who expect to complete their education within 6 months of the date of filing application. Students who complete their work for bachelor's degrees may be able to qualify for GS-5. Students who have experience in the engineering field plus a degree may qualify for higher levels. There will be no written tests; all applicants will be qualified on the basis of their education and experience.

Persons interested in applying should contact the United States Civil Service Commission and request application blanks for Announcement No. 301, issued September 11, 1951.

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● The first joint Society meeting of this year was held Wednesday night in room 101 in the Hall of Government. The guest speaker, Mr. Charles H. Tompkins, G. W. alumnus and prominent Washington engineer, gave an interesting informal talk on the advantages of belonging to a professional society and the present outlook for the graduating engineering student. After the talk Mr. Tompkins spent about a half hour answering questions from the audience relative to methods of approaching a prospective employer, the possibilities of an engineers' union, and the general feelings of private firms toward personnel who have worked for the government and who desired employment in private industry.

After the joint meeting the various societies separated for their individual meetings. The film "Operation Crossroads" was shown for those who had short meetings.

● Xi Chapter of Sigma Tau's first meeting of the school year was held October 24 in room 200 of Building C. A list of eligible prospective members was submitted to the members for their consideration during the ensuing month. There was some discussion as to whether or not the Chapter should undertake some project for this school year.

● The George Washington University student branch of the ASCE invites all CE majors, BS in Engineering students, and any other student engineers who may be interested to join the ranks. Keith Hord, president for this year, promises that the ASCE will continue its reputation as one of the most active engineering groups on campus.

● IRE is featuring as guest speaker at their November meeting Dr. Ralph J. Slutz from the Computing Machine Laboratory, National Bureau of Standards. He will speak on the "Standard's Eastern Automatic Computer." The meeting will be held in Room 2, Government Building, on Wednesday night, November 7, at 8:15.

● The ASME Student Chapter at its next regular meeting on November 7, will hear an historical talk on the development of steam engines up to the Cornish engine, the first engine to utilize steam above atmospheric pressure. The guest speaker is Mr. James Taylor Kemp, an authority on steam power, who will talk on the Cornish engine and show movies related to his topic. Bob Smith, chairman of the membership committee, invites all ME's who have somehow forgotten to sign up for the ASME this year to drop around to the meeting and get acquainted.

(continued on next page)

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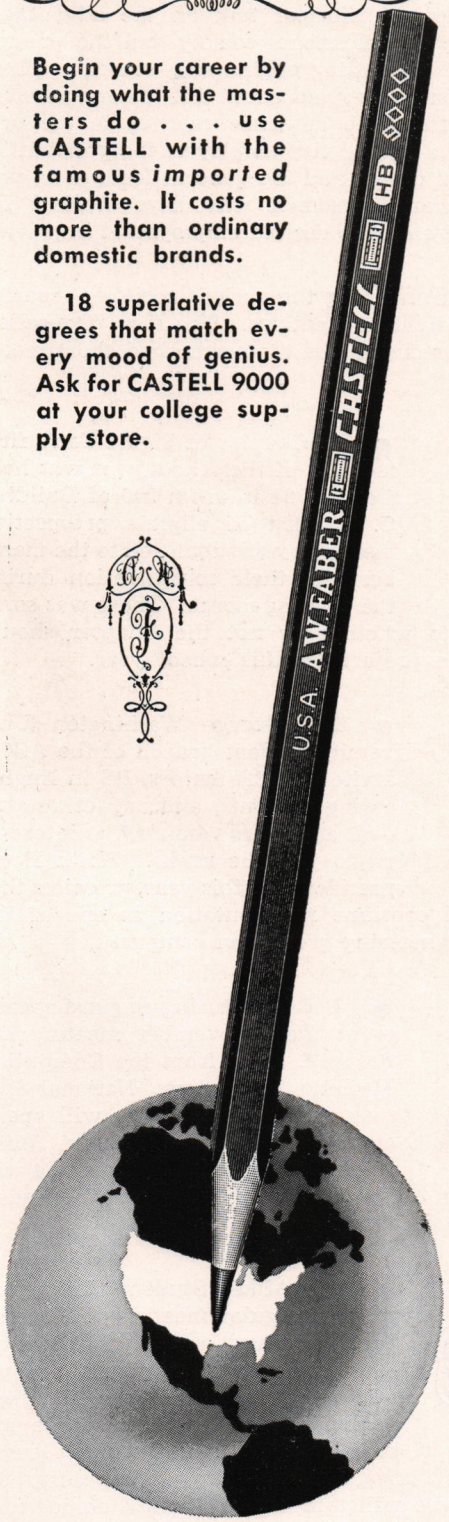

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SOCIETIES *(continued from preceding page)*

● The Washington Section of the AIEE held its first meeting of the 1951 - 1952 season at the Engineers' Club of Baltimore, Monday the 15th of October. Mr. G. N. Brancato, Meteorologist-in-charge of U. S. Weather Bureau, Maryland and Delaware Areas, was the guest speaker. The subject of his speech was "Weather and Electrical Operations," in which he covered some of the problems of weather forecasting and the effects of weather on electrical maintenance operations. The meeting was preceded by a fellowship hour and a dinner.

This coming Wednesday, November 7, the student section of the AIEE will hold its first regular meeting. On hand as guest speaker of the evening will be Mr. Charles Ange of the Okonite Co., Passaic, New Jersey. Although Mr. Ange is a graduate Chemical Engineer, he has been associated with the electrical industry and the Okonite Co. for a number of years and has become an authority on insulated wire and cable for power transmission. He will talk on the subject "Types of Power Cable", giving some of the problems faced in their design and development. All members and new students are invited to attend.

● Theta Tau enjoyed its first meeting of the school year on October 17 in D-202. A full social program was decided upon, to be inaugurated with a shrimp feast on November 10 out at Meadowbrook, at the Maryland end of Rock Creek Park. The fraternity also decided to enter a float in the homecoming game float contest. The theme was to have been the chopping off of the Wake Forest Deacon's head by our George, but unfortunately construction difficulties caused the abandonment of the project two hours before game time.

Much was done by Gamma Beta chapter during the summer. We had a stag smoker that will live for a long time in the memories of those who were lucky enough to attend.

There was a good turn-out at the wedding of Bob Smith late in the summer. The boys who took the bridegroom on his bachelor party to Baltimore the night before the wedding barely made it through the next day, but Bob looked fine in spite of having been up all night.

On October 6, we held our fall initiation, which was followed by the traditional banquet and dance, both at the Lee House. The chapter welcomes Levern Zeigler, Bill Wooldridge, Lowell Finch, Bob Baumann, Peter Caffes and Ben Anderson as the new initiates.

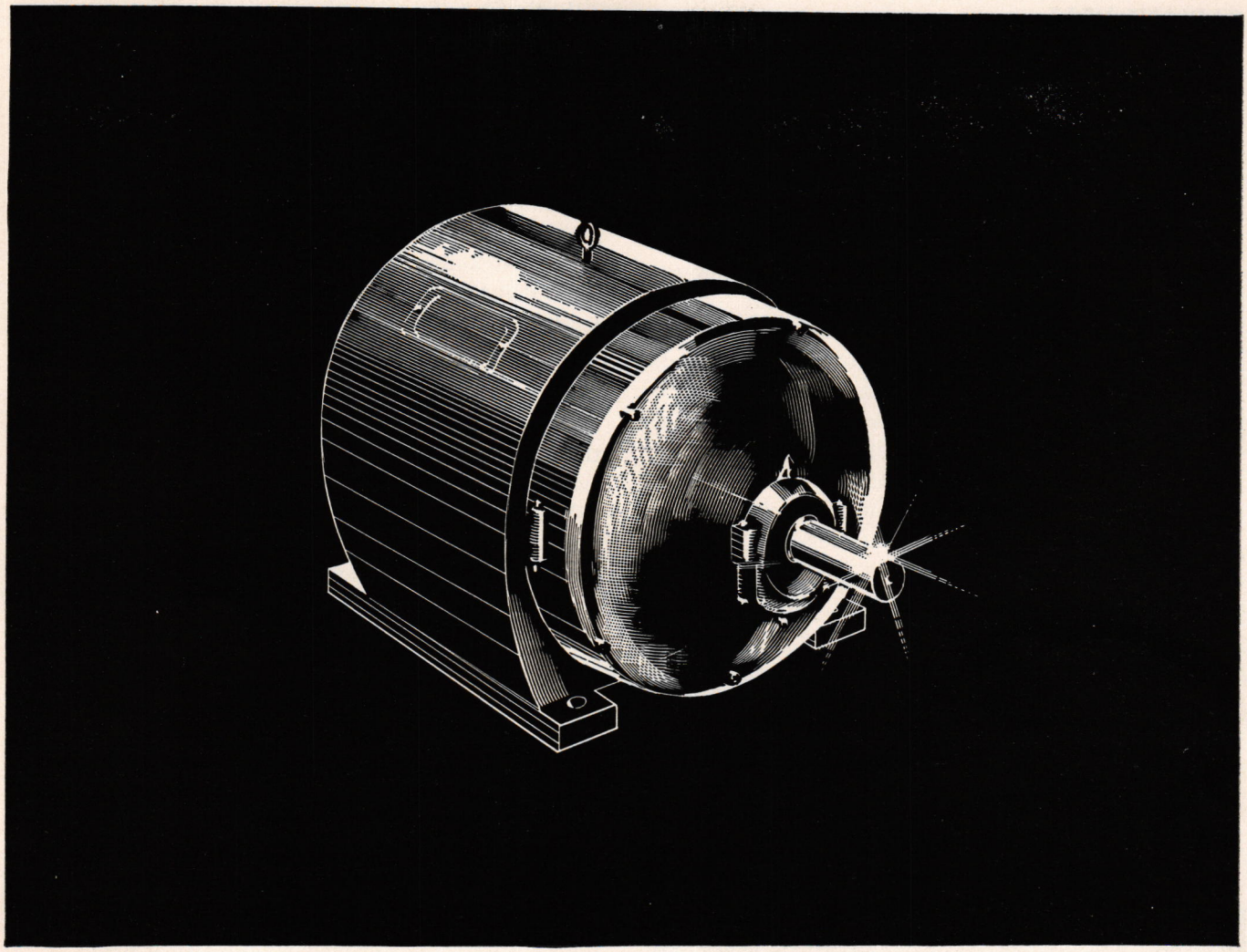
. . INCREMENTS

● "Perhaps the most valuable result of all education is the ability to make yourself do the thing you have to do, when it ought to be done, whether you like it or not; it is the first lesson that ought to be learned; and however early a man's training begins, it is probably the last lesson he learns thoroughly." —Thomas H. Huxley

● It has been determined that an increase in the slope of the ground from 6 to 8.48 per cent increases run-off by about 35 per cent, and approximately doubles the amount of erosion.

● The Pennsylvania Turnpike Commission had the toll-booths on that super-highway designed as sectional, steel, prefabricated buildings so that the considerable damage constantly occurring to these buildings may be easily repaired. Besides removable sections, these booths have shatter-proof, heat-resistant glass mounted in rubber in the windows, and interior furnishings scientifically arranged for greatest operator comfort.

● Down in Madison County, about 15 miles north of Jackson, Tennessee, two bridges were recently constructed of concrete block beams. These beams were fabricated by stringing hollow concrete blocks on a cable like beads, and pre-stressing them with hydraulic jacks. The bridges are designed to sustain safely an H 10-44 loading, or one H-15 truck.



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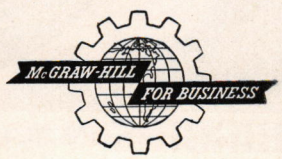

RADIANT HEAT *(continued from page 11)*

conditions) only 16 btu are radiated per hour. Every surface at a higher temperature than the air surrounding it loses some heat by convection, and we see from Figure 2 that the 85°F panel will give up about 14 btu per hour by this means at a still air temperature of 69° F (average for an MRT of 70°F). This is a total heat output of 30 btu per hour per square foot of panel, under the best conditions. Whenever design conditions demand a greater output per square foot of floor area, as they usually do in Washington, a floor panel will not do the job alone. From Figures 1 and 2, we find that ceiling and wall panels have maximum outputs under these same conditions of from 100 to 110 btu per square foot per hour, which is considerably above design condition demands near Washington. For this reason, ceiling or wall panels, though more costly to install, are recommended for radiant panel heating in this area.

It can also be seen that in order to raise the surface temperature to the desired point, the entire mass of the panel must be heated to above this temperature. In the case of concrete floor slabs and even plaster walls, this mass is considerable. It follows from this that both inside and outside surfaces of the panel will radiate. Since radiation outward is lost heat, this must be prevented. Insulation, particularly reflective insulation, will materially reduce this lost heat.

THE "INDOOR SUN" MYTH

As has been stated previously, the intention in radiant heating is to irradiate the inside surfaces of the building, not the individuals in the building. Some radiant energy is intercepted by the occupants, but Prof. F.W. Hutchinson, of the University of California, reports that his tests show this to be less than 1% of the total energy radiated.

Most of the beneficial effects of natural sunshine result from the shorter wave lengths at the ultra-violet end of the spectrum. The frequency of radiation from the relatively low temperature panels in a heating system, a function of the temperature, is also very low, being far down in the infra-red region of the spectrum. It can be seen that there is no foundation for the claim that radiant heating bathes the home in healthful radiation.

CONCLUSIONS

With all of the foregoing background in mind, we are in a position to evaluate the conflicting claims both for and against radiant heating. There was no quarrel with the contention that it was esthetically pleasing and that floors are warm. In connection with the latter, it might be well to point out that "heat rises" is a popular misconception; it is heated air which rises. Radiation is in all directions, and the floor is warm with a ceiling panel as well as with a floor panel.

It is a trifling point from the engineering viewpoint, but radiant heating cannot be said to be modern. Instances of its use by the Romans in heating their baths by this method have been proven by 2000-year-old ruins.

While plumbing costs are generally lower on radiant panel heating, the necessity for very good insulation and occasional intricate and expensive control systems make the relative economics of installation of radiant versus conventional systems a moot question. The same cannot be said for operating costs. Comprehensive tests by E. G. Sunday, fuel application engineer with the Washington Gas Light Company, establish that not only is radiant heating never cheaper to operate, but unless the system is well engineered and well installed, costs average from 10% to 20% higher per heating season.

The discussion of the aims of radiant heating have established that this method does produce a more natural environment, with a concomitant increase in comfort. Environment-sensitive persons, particularly women and the aged, claim to find this factor, enhanced by the esthetic appeal of invisible heat, worth the added operating cost of a properly designed and installed radiant panel heating system.

New portable radiotelephone, of less weight but longer range, designed and built by RCA engineers.

Longer range, but lighter weight for the "Take-along Radiophone"

You've undoubtedly read how useful our Armed Forces found their portable radiotelephones. Now this indispensable military instrument has become even more efficient.

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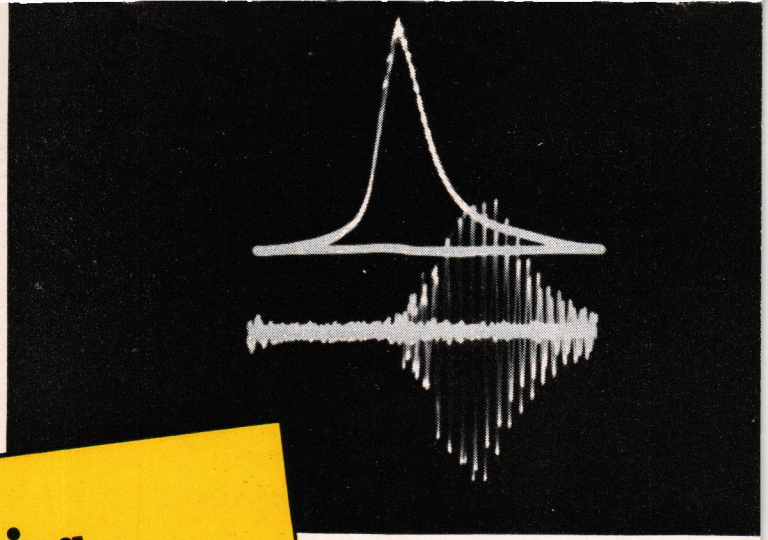
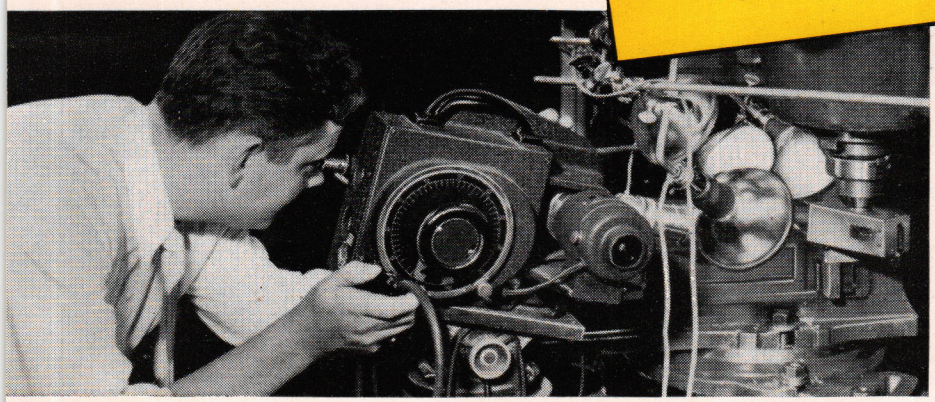
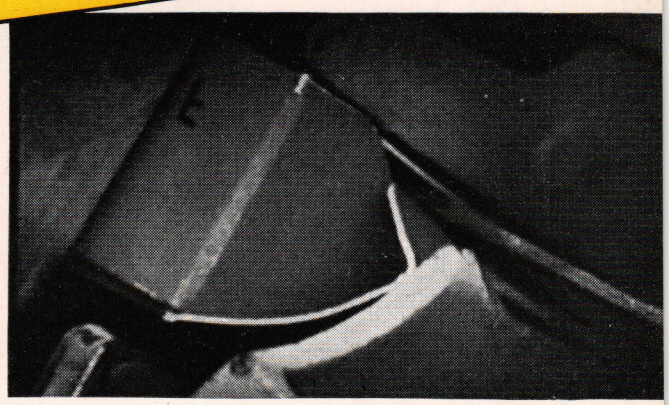


Engineering makes good use of photography's flashing speed

Reproduces Drawings In Seconds. Data, drawings, shop orders, specifications—all can be photocopied fast and accurately. Kodagraph papers, cloth, and film save time, protect originals from wear and tear—even produce legible copies from faded and worn material.

Captures The Flick of Instruments. The flash of the cathode-tube beam and the swift swing of the galvanometer mirror are not too fast for photography. It captures and records readings so that they can be analyzed and reveal all the information they contain.





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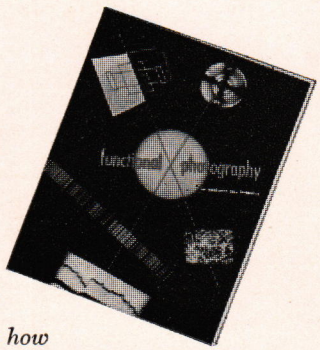

It tells how photography is used to:
Speed production • Cut engineering time • Assure quality maintenance • Train more workers faster • Bring new horizons to research

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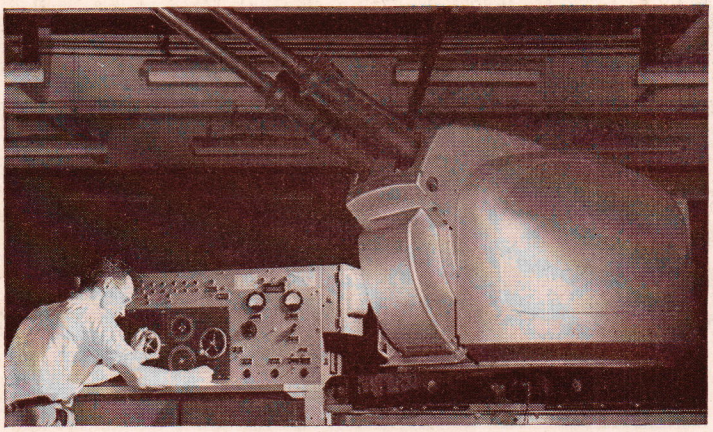
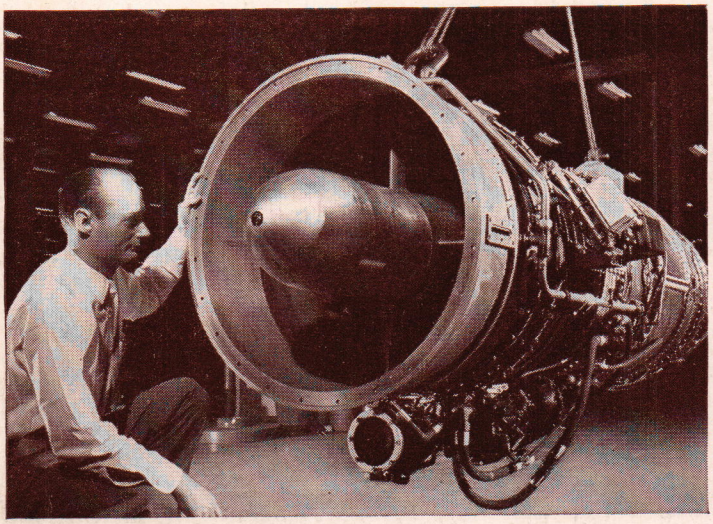


A gun turret for the B-36 bomber undergoes test as it comes off the assembly line at a General Electric plant.



An advanced model of General Electric's J-47 turbojet engine packs far more power within the same size.

G-E engineers developed this portable steering unit which enables Navy ships to be steered from any of several widely separated strategic positions.

Ideas from college graduates at General Electric are helping U. S. mobilization

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There's a major reason why General Electric is asked to contribute to so many of these projects. The Company has prided itself on building an outstanding engineering, technical and business organization, one that can take the toughest problems and master them, one that can be a steady source of new ideas.

Young people from American colleges and universities, their skills and talents further developed through G-E training courses and rotational job programs, are forming the core of that organization and are the source of the ideas that are standing the nation in good stead.

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